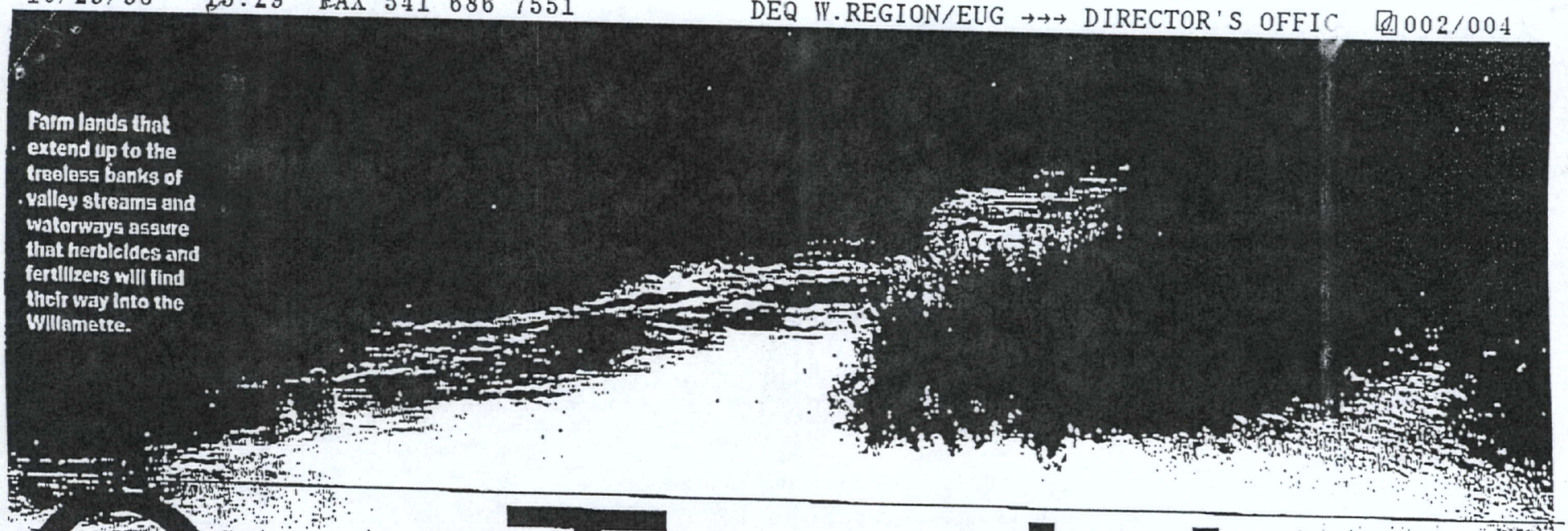


Farm lands that extend up to the treeless banks of valley streams and waterways assure that herbicides and fertilizers will find their way into the Willamette.

Our Troubled

SEDIMENTS IN A 5.5-MILE STRETCH OF THE Willamette River in the Portland harbor are so pollured with tars, pesticides and other chemicals that the U.S. Environmental Protection Agency announced last week it is considering naming the area a Superfund site.

Concern over the pending announcement had for the past few months motivated state officials and industries lining the harbor to put together a cooperative clean-up plan to avoid the stigma of a federal listing. River advocates say whether the cleanup is a joint state and private effort or overseen by the federal government, the important thing is that the river be cleaned up, and that the job be done right.

"We need to do something about the problem out there. It's a ticking time bomb," says Don Francis, who in 1996 formed the nonprofit group Willamette Riverkeeper to advocate for the river's health.

Rivers are like gutters, Francis explains. "They catch everything that flows off the land. And the sediment is at the bottom of the gutter." The chemicals embedded in the sediment lining the harbor include DDT and PCB residues from decades ago, as well as toxic runoff from industries that currently operate along that stretch of the river or from manufacturing interests that have moved away.

This isn't the first time the 187-mile-long river that feeds the heartland of western Oregon, and in whose valley about 70 percent of Oregonians live, has faced an environmental crisis. In November of 1938, more than 4,000 school children protested against the state's filthy rivers, including the Willamette, which then were used as dumps for untreated sewage and food processing wastes. That effort helped pass a bill requiring cities to build sewage treatment plants, but the temptation to use the Willamette for cheap waste disposal was too strong for the booming river basin economy. The dumping continued.

In 1962, television newscaster and future Oregon governor Tom McCall produced the documentary, *Pollution in Paradise*, which showed footage of raw sewage and industrial waste pouring from pipes into the public's beloved Willamette. Minnows were shown dying within minutes of being exposed to the river's oxygen-depleted water. Pollution-tolerant carp were shown belly-up, floating on a film of oily scum. The river, the tenth largest in the U.S., was then considered the most polluted river in the Northwest and among the dirtiest in the U.S.

McCall won his bid for governor in 1966, and rescuing the river from choking industrial muck rose to the stop of the state's legislative priorities. Laws were tightened or rewritten, and the Department of Environmental Quality was created to monitor water quality. So successful was the cleanup that in 1972 the Willamette landed on the front cover of *National Geographic*. "A River Restored: Oregon's Willamette" read the headline. The river that connects the Cascades to the Columbia became a national symbol of hope for polluted waterways throughout the nation.

That declaration of victory was premature, Francis says. Yes, the late '60's effort stemmed the gush of organic material into the river, and the river's oxygen-starved condition was turned around. "But what we didn't look at were toxic chemicals, long-lived organochlorines and other chemicals that take decades to break down," he says. "Today, every fish in the river has toxic chemicals in them."

What fish are left, anyway. Fish researchers for years have been sounding warnings about depleted runs of winter steelhead and spring chinook in the Willamette and its tributaries. Winter steelhead in the lower Willamette have already been listed as threatened, and a listing for both these species in the upper reaches of the river is expected in the near future.

Other fish in the Willamette are showing signs of a not-yet-identified environmental or genetic stress. In a study of juvenile squawfish between 1992 and 1994, researchers found deformities in as many as 74 percent of the fish, which are native to the Willamette, in a 10-mile area above Oregon Falls known as the Newberg Pool. The cause of the bent spinal cords hasn't yet been determined. A recent news documentary shown on OPB's "Oregon Field Guide" also referred to increasing numbers of Willamette river fish displaying unnatural conditions such as lesions, parasites or missing eyes.

Out of a Pipe

Whereas scientists have yet to pinpoint exactly what conditions are stressing the Willamette's fish populations, indications are that pollution in the river is among the significant contributors.

Pollution into the Willamette comes from two general sources, called point source and non-point source pollution. Industrial discharges, or any effluent that flows out of a pipe into the river, are considered point sources. Non-point sources include less specific runoff from such sites as agricultural lands, golf courses, construction projects, storm drains and household lawns.

The passage of the federal Clean Water Act in 1971 restricted industrial pollution of the nation's waterways, but manufacturing plants situated along rivers are still legally allowed to discharge a certain amount of waste into waterways.

In Oregon, industries dumped just under 5 million pounds of pollutants into the Willamette from 1992-1996, according to a 1998 report released from the U.S. Public Interest Research Group (PIRG). Of those, 46,600 pounds were carcinogens, 101,000 pounds were persistent toxic metals, and 473 pounds were reproductive toxins.

The national report was based on data from the Environmental Protection Agency's toxics release inventory, in which industries are required to document their discharged pollutants.

Tops in overall discharges into the Willamette was the Wah Chang facility in Albany, a smelting and refining facility that released three million pounds of toxic chemicals into the river during the four-year period. In second place was Wacker Siltronic Corp. of Portland, 883,350 pounds; and third was Pope & Talbot, the Halsey pulp plant, 254,431 pounds. According to the report, the Halsey plant was also the state's top discharger — at 23,000 pounds — of carcinogens into the river.

Jim Denham, public affairs person for Oremet Wah Chang in Albany, says the toxics reporting process is long, complicated and very intensive. He objects to the non-specificity of the PIRG report's numbers, and says conclusions can only be drawn after studying detailed breakdowns of the company's discharge numbers, documents that are public records. "What you need to look at is concentrations and effects those concentrations have on the receiving streams," he says. Bryson Twidwell, senior industrial wastewater specialist at DEQ, also says the numbers taken from toxics reporting forms can be subject to biased interpretation.

But Richard Pulchalsky, who authored the national PIRG study, says that the numbers were taken directly from the forms industries fill out detailing the pollution they are releasing into the environment. "These are the facility's numbers, not the EPA's," he says. "We took the numbers from the computer data base, and made a total of what facilities they said were putting out as pollution. I just don't see where bias comes into it."

Set back off country roads outside the valley town of Halsey, the Pope & Talbot plant, built in the late '60s by American Can Co., is surrounded by acres of rich, flat cropland. The plant is located about a mile from the river and uses an underground pipe to carry effluent from the plant to the middle of the river, where the industrial byproducts are discharged.

In the early 1990s, Pope & Talbot faced a barrage of public criticism for the effluent, because the dark, coffee-colored material spewing from the underground pipe drastically changed the color of the green Willamette. "The color wasn't harmful, but the aesthetics weren't very good," says P&T mill manager Wayne Henneck. There was concern, too, he says, that the effluent could have "some effect on how light penetrates the water."

After hundreds of hours of effort, the plant has reduced the color of the effluent by 70 percent, Henneck says, proudly. "Now it looks more like apple juice."

But today the plant faces a more complex challenge than simply the color of its discharge. The EPA has recently handed down strict guidelines calling for all pulp plants in the U.S. to reduce the amount of carcinogens created and released in the pulp manufacturing process.

Henneck and Art Fosberg, environmental compliance manager at P&T, say the releases the OPIRG report identified as carcinogens are most likely residues particular to the pulp industry, such as dioxin, chloroform, furans, chlorinated phenolics and compounds referred to as AOX, which are considered indicators of the presence of organochlorines, some of which are known carcinogens.

According to Henneck, over the past few years Pope & Talbot has spent $30 million to reduce its production and release of the ultra toxic chemical dioxin. Sophisticated tests to detect dioxin are now conducted quarterly throughout the plant's systems, Henneck says, "and we can't find it."

Just this past April, he says, EPA handed down "cluster rules" calling for a reduction in the chloroform and chlorinated phenolics produced and released in all domestic pulp plants. Pope & Talbot has already met the requirements for dioxin, he says, but as for organic chlorine compounds, "we cannot meet that number, or the one for chloroform." The plant has until the year 2001 to conform to the new regulations.

A 1997 document created by the Corvallis Environmental Center reviewing discharge permits filed at the Oregon Department of Environmental Quality reported that Pope & Talbot had a permit for releasing dissolved solids (TDS), suspended solids (TSS), biochemical oxygen demand (BOD) and dioxin (TCDD) into the river. According to the document, the plant generates over 12 million gallons of wastewater each day and was cited with five Class 2 water quality violations from 1994 to 1997. Three were for exceeding effluent limits, one was for having a non-qualified treatment plant operator, and one was for an operator's failure to report fecal coliform lab data properly.

According to the same document, the Wah Chang permit allowed for discharges of ammonium-N, thiocyanate ion, methylisobutyl ketone, oil and grease, total residue chlorine, ph,

titanium, TSS flouride, molybdenum, radium-226 and total organic carbon. According to the Corvallis center, Wah Chang had eight water quality violations from 1994-1996, all for exceeding effluent limits including radium-226, methylisobutyl ketone and cyanide. Wah Chang was put on a Superfund list in 1983 because former waste pond sludge contained uranium and other radioactive wastes.

There are two manufacturing facilities in Albany — Oremet, a titanium production facility, and Wah Chang. Both are now owned by the parent company Allegheny Teledyne Inc. Both plants release effluent into nearby streams, Oremet into Oak Creek and Wah Chang into Truax Creek. "In both cases," says Wah Chang spokesperson Denham, the releases "have a net beneficial effect on the receiving stream." Both waterways are intermittent streams, he says, and don't flow year-round. "Our discharges provide a steady flow during those months, and support more in the way of habitat for native species than similarly situated streams in the valley that dry up during the summer."

DEQ's Twidwell says the Wah Chang facility has upgraded significantly since 1996, and "now is discharging less than when that (PIRG) information came out."

Twidwell says the permitting process is designed to assure a balance between industry discharge and river health. "We have to balance it out, find out what the river can handle and what it can't," he says. "We have to make sure we are safeguarding the environment, and making it safe for dependents and our descendants. We're the last line of defense the environment has."

Off the Ground

As mind-boggling as the amounts and types of industrial discharges are, point-source pollution, says Francis, "is not our greatest challenge." Francis and others who study the river are in agreement that, today, the lion's share of the pollution load on the Willamette comes from non-point sources — pesticides and fertilizers from agricultural or private land, industrial runoff, debris from constructions sites, even used motor oil poured down storm drains.

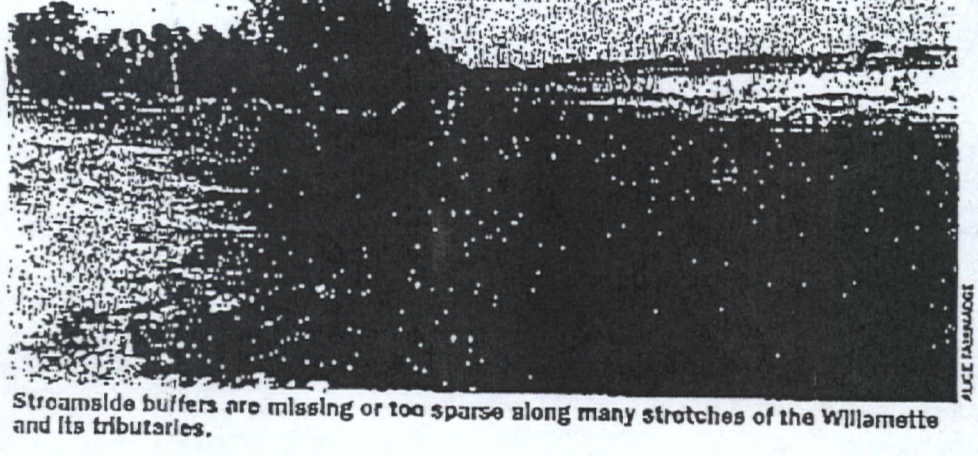
Because runoff comes from so many different origins, it is difficult to measure. In addition, Twidwell says, "it's hard to generate numbers on non-point sources, mainly because it hasn't been looked at that much."

On a recent October road trip through the lush farmlands of the Willamette river basin, Francis points to slight, almost invisible indentations running through many of the area's brown or barely green fields. "There's a crease. That's where it all starts," he says. Farmers form these tiny grooves to help channel excess water off their fields, he explains. Those grooves then channel water to roadside ditches, which flow into small creeks or rivulets, which then flow into larger tributaries that find their way into the Willamette.

River

Years of complacency have brought the Willamette to a crisis point. Can we muster the political will to act?

BY ALICE TALLMADGE



ALICE TALLMADGE

Streamside buffers are missing or too sparse along many stretches of the Willamette and its tributaries.

...Willamette done by the U.S. Geological Survey, about 4.5 million pounds of pesticides and herbicides are applied each year in the Willamette Basin. To test for the presence of chemical pesticides in the water, researchers took water samples at different times from 16 agricultural streams and from four urban streams.

The most common pesticides found in the water samples were the herbicides atrazine (found in 99 percent of samples studied), desethylatrazine (93 percent of samples), simazine (85 percent of samples), metolachlor (85 percent of samples) and diuron (73 percent of samples). In general, higher concentrations of herbicides were found in streams draining agricultural sites. Atrazine was found in every sample tested, except one.

The EPA classifies atrazine and simazine as possible human carcinogens. According to the Eugene-based group Northwest Coalition for Alternatives to Pesticides, studies have linked atrazine and simazine to breast cancer and to male fertility problems. (Desethylatrazine, a metabolite of atrazine, has not been tested by the EPA for these links.) Atrazine has also been reported to have hormone disrupting effects.

The Willamette basin's web of waterways also is a conduit for runoff from nitrogen and phosphorus fertilizers. In 1991, the study found, farmers applied 63,000 tons of nitrogen and 20,000 tons of phosphorus fertilizer to agricultural crops. Although these nutrients are essential for plant growth, they can be deadly for a waterway, fostering excess algal growth that ends up choking stream channels and using up essential oxyen in the river.

The USGS report found higher nitrate and phosphorus concentrations in Willamette basin streams draining agricultural land. The presence of both nutrients was highest in the fall, when seasonal rains create increased runoff from fields. Researchers also found evidence of nitrogen in ground water of the sample areas studied.

On the Banks

The amounts of chemical pesticides and fertilizers could be curbed if the Willamette had sufficient vegetative buffers along its banks, Francis explains. Bushes and trees function as organic sponges, absorbing excess nutrients and trapping the soil particles to which nitrogen and phosphorus cling. But in much of the valley, the river buffer is pathetically inadequate, he says, with just "a one-cottonwood tree veneer" separating sprayed and fertilized croplands from the river bank.

Although the river itself is the heart of a river system, the buffer is the guardian, providing shade and bank stability as well as food and shelter for a host of essential organisms. Buffers provide homes and food for birds, rooting wood for insects, limbs and fallen trees that create "hiding places" for fish. Unbuffered river banks are more subject to erosion, unable to shade the water from sun and unable to do the essential job of keeping pollutants away

yellow pine, wetlands, sloughs and side channels. But over the years the push to use the river and its corridor for navigation, economic development and farming has led to drastic changes. The main channel has been straightened, the flood plain has been developed into malls and housing lots, and hundreds of acres of riverside habitat have been lost.

In fact, of all the stresses on the Willamette River — including nutrient, pesticide and chemical contamination — the most significant the USGS study found was the loss of these vital stream buffers. Stream habitat conditions in the Willamette "were among the most degraded" of all the rivers studied in the national survey, researchers found. And decreases in fish populations and health paralleled poor habitat conditions.

Rebuilding and enhancing riparian habitat is among the most logical and least controversial of all proposed "fixes" to the river. And, says USGS hydrologist Chauncy Anderson, whose studies of the Willamette were used in the USGS project, "it's one of the most important things that can be done. Better riparian conditions mean increased bank stability, better food supplies, lower water temperatures and a reduction of sediments flowing into the water, he says, all of which will make a healthier environment for fish. Building up these buffers "will have a lot of positive benefits, not just one targeted improvement."

Apparently the government agrees. Just two weeks ago, the U.S. Agriculture Department announced a plan to pay Oregon farmers and ranchers as much as $50 million over the next 15 years to plant trees and vegetation along streams that run through their private property. The streams must provide habitat for fish species listed under the Endangered Species Act.

The state will contribute $50 million to the plan, called the Conservation Reserve Enhancement Program. And although it is unclear how much of the program will target the Willamette or its array of tributaries, the program is expected to significantly enhance at least some parts of the system.

Francis says the program is a step, but not in itself a solution to the Willamette's ills. "Restoring the health of the watershed is going to take a lot of effort, a lot of money, and it's going to take years," Francis says. "We're going to need a good-sized toolbox, and CREP is simply a bigger tool."

Our River, Our Selves

In the last few years, the Willamette has been the subject of hundreds of hours of study and debate. A 22-member Willamette River Task Force, named by Gov. Kitzhaber, met for months and in December 1997, issued 100 recommendations to replenish the river. Just this past September, Kitzhaber unveiled the Willamette Restoration Initiative, which will bring public and private interests together to implement some of the task force suggestions.

Francis holds on to some hope that concrete steps will be taken to restore the Willamette, but he is losing patience. "We can study the river system for 50 years, and we're still not going to understand it completely," he says. "Studies can become political excuses for inaction, for not making hard decisions, hard choices."

Jeff Allen, director of the Oregon Environmental Council, was a member of the task force and is also a member of the board of directors of the restoration initiative. He has condensed his prescription for healing the river into several concrete steps, including phasing out persistent toxins that

Green Farming

Third-generation Albany farmer Peter Kenagy speaks with a tone of acceptan... that can only come when your livelihood rel... heavily on the whims of Mother Nature.

ALICE TALLMADGE

Third generation Albany farmer, Peter Kenagy, experiments with river-friendly agriculture.

"Bean yield was down this year," says ... the slight, wiry, 38 ye... old, gesturing at the ... field with soil stained ... fingers. "And the co... blow down took fou... times as much work ... harvest." Still, he say... "the grass seed came ... good."

Kenagy grows sw... corn, green beans, g... seed, grains, native ... grasses on his 325-a... farm, some of which ... have been in his fami... for 60 years. Situated ... along the Willamett... River, just north of ... Albany, the farm is ... home to Kenagy, his ... wife and two kids, a ... dog, cat, and a motl... collection of goats, ... geese and sheep. ... Kenagy's parents live ... right next door.

For years Kenagy ... has been working w... Oregon State University to experiment with ... changing certain agricultural practices to be... mesh his farm into the eco-web of the ... Willamette corridor. He's yanked out predo... blackberries and low-quality hardwood tre... on some of his land along the river and re-... planted the area with hazelnut, elderberry ... cascara to provide a more varied habitat fo... birds and other wildlife. In one field he's at... tacked canary grass, "the most invasive, no... native species in the Willamette River bott... and replaced it with a wetlands sedge and ... type of water plantain. Currently, he has w... ing contracts to grow several different type... native grasses to produce seed for use in re... ling wetlands.

Kenagy's efforts to integrate sustainabl... river-enhancing practices into his farming ... tices illustrate how complex it can be to ba... the needs of the river with the economics o... farming.

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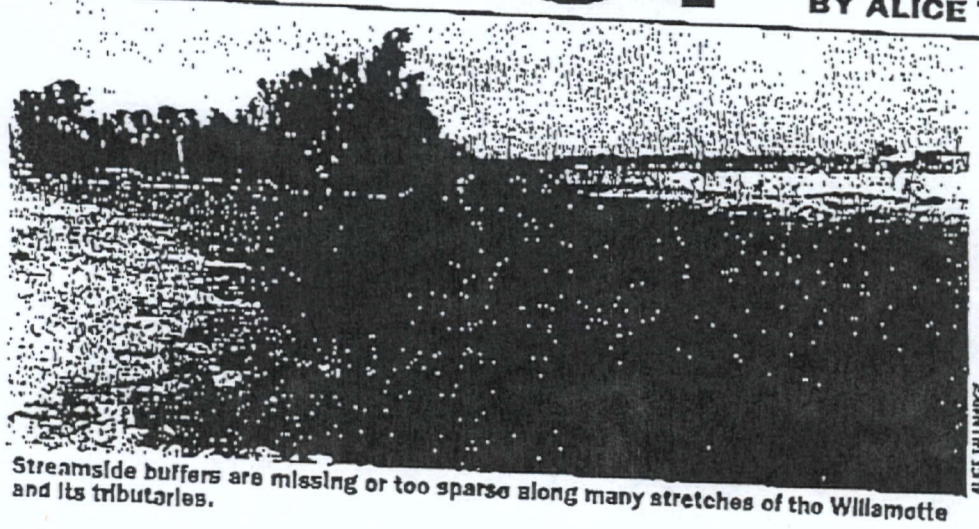

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The Willamette basin's vast network of capillaries is also a delivery systems by which loads of chemical herbicides and fertilizers are carried into the river each year. Many of these chemicals attach themselves to dirt particles and are washed into waterways when seasonal rains or irrigation erode the soil.

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About 150 years ago, says Francis, the Willamette River looked entirely different than today's "one little blue ribbon on a map from Eugene to Portland." Back then, the river corridor was often two miles wide and encompassed a braided network of bottomland forests of oak and

perennites and a reduction of sediments flowing into the water, he says, all of which will make a healthier environment for fish. Building up these buffers "will have a lot of positive benefits, not just one targeted improvement."

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Jeff Allen, director of the Oregon Environmental Council, was a member of the task force and is also a member of the board of directors of the restoration initiative. He has condensed his prescription for healing the river into several concrete steps, including phasing out persistent toxins that the river cannot assimilate; creating a pesticide tracking system; designing pollution-prevention incentives for industry; reducing runoff; restoring river lands and wild fish; and managing growth and development in the river corridor.

The implementations will be challenged, he says. People will likely butt heads over such issues

Albany farmer, Peter Kenagy, experiments with river-friendly agriculture.

dog, cat, and a motley collection of goats, pigs, geese and sheep. Kenagy's parents live right next door.

For years Kenagy has been working with Oregon State University to experiment with changing certain agricultural practices to better mesh his farm into the eco-web of the Willamette corridor. He's yanked out predatory blackberries and low-quality hardwood trees on some of his land along the river, and replanted the area with hazelnut, elderberry and cascara to provide a more varied habitat for birds and other wildlife. In one field he's attacked canary grass, "the most invasive, non-native species in the Willamette River bottom," and replaced it with a wetlands sedge and a type of water plantain. Currently, he has working contracts to grow several different types of native grasses to produce seed for use in restoring wetlands.

Kenagy's efforts to integrate sustainable and river-enhancing practices into his farming practices illustrate how complex it can be to balance the needs of the river with the economics of farming.

For instance, some farmers, such as Kenagy, are beginning to grow cover crops in their fields during the off-season. The purposes of cover crops are many: to break up cycles of disease, pests and weeds; to absorb and recycle excess nutrients, such as nitrogen; to suppress weed growth; to feed and stabilize soil; and in general to help keep pollutants out of the river.

But, come spring, cover crops have to be gotten rid of before cash crops can be planted. Tilling the cover crop under is a common solution, but Kenagy says the practice is also "the most abusive thing you can do to soil." Tilling chews up valuable earthworms, he says, breaks down organic matter in the soil and renders the soil far more erodable.

In place of tilling, Kenagy, uses the common herbicide RoundUp (glyphosate) to kill the cover crops. Kenagy shrugs off any concerns about the herbicide, which is manufactured by Monsanto Co., but others don't. Caroline Cox, member of Northwest Coalition Against Pesticides and editor of the *Journal of Pesticide Reform* has recently completed a 15-page article on Round-up, in which she challenges a host of claims about the herbicide's safety, and concludes that the chemical is acutely toxic to humans and animals, persists in the environment and reduces populations of beneficial birds, insects and small mammals.

Even though some farmers and some environmentalists may not agree with his methods, it's essential that the state encourage progressive farmers such as Kenagy who are willing to experiment, and not shut them out of bankrupt them by efforts to restore the river, says Don Francis of Willamette Riverkeeper. Oregon, he says, is one of few states in which family farms are still viable. Elsewhere, "they're owned by huge multi-nationals, and a small farmer is more likely to care about the river than a CEO back on the East Coast." —AT

as what to do with dams, how to stem agricultural runoff or whether to create a pesticide tracking system. But by far the biggest boulder blocking restoration efforts is the state Legislature. "Not that they are necessarily lining up to say 'we're against restoring the Willamette,'" he says. "But there's a lot of real unwillingness to deal with some serious issues."

The governor, he says, has helped raise awareness about the plight of the river. "But there's only so far he can get on his own," Allen says. "Part of the problem with the Legislature is that they see anything with his name on it and reject it out of hand."

Allen says that any cooperative effort to clean up the Willamette will of necessity overflow to include a clean up of the entire watershed. And that, he says, will be a good thing. "We'll come together to clean up the river, and we're going to be cleaning up the state in the process."

For centuries the river has been muse to poets, philosophers and dreamers of all ages. Rushing in spring, placid in summer, mysterious in winter, the river has been used as a metaphor for life, time, memory, oblivion, the cycle of yearly returning. We take our burdens to the river, our joys, our kids, sometimes the ashes of our dead. We lift our faces to the mix of smells that rise from its gliding surface: the fish it carries in its belly, the touch of wild it carries from the mountains.

"I've known rivers / ancient, dusky rivers / My soul has grown deep like the rivers," wrote the poet Langston Hughes in his poem *The Negro Speaks of Rivers*. "I've known rivers ancient as the world/ and older than the flow of human blood in human veins." So fully did the writer James Joyce grasp the mythical and symbolic significance of rivers that one of his main characters in his masterpiece, *Finnegans Wake*, personifies a river. Joyce also closed his work with the words, "Beside the rivering waters of, hitheringandthithering waters of. Night."

But whether on the brink of the 21st century the will of the Oregon public and the state's leaders will uphold values recognized by centuries of poets and thinkers and river lovers remains an open question. As these visionaries have already told us over and over, a river can only reflect the value bestowed upon it.

Restoring the Willamette will require many people and businesses to change ingrained attitudes and behavior, Allen says. "But the good news is, there are more people who live in the watershed who are really passionate about living here, who care about the river or the tributary they live near. They are willing to do what it takes to clean it up." ■